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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/724,641

12/02/2003

Pierre Dierickx

2003-1733A

2011

513 7590 02/15/2007  
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WASHINGTON, DC 20006-1021

EXAMINER

YEE, DEBORAH

ART UNIT

PAPER NUMBER

1742

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

02/15/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/724,641

Applicant(s)

DIERICKX ET AL.

Examiner

Deborah Yee

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,5,8-11 and 19-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5,8-11 and 19-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12-21-06 has been entered.

### ***Double Patenting***

2. Claim 21 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 1. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). Claims 1 and 21, both recite a bainite microstructure.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 1, 5,8,9,10,19, 20 and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al (US Patent 5,660,648) alone or in view of Nakamura et al (US Patent 6,558,483).

5. Takada in claims 1 to 9 in columns 11-14 discloses an analogous bainitic steel part processed in substantially the same manner as claimed by applicant comprising the steps of preparing and casting a steel alloy, hot forging at a temperature of at least 1270K (equivalent to at least 997C and overlaps claimed forging temperature range of 1100 to 1300C), air cooling, and aging at 450 to 900K (equivalent to 127 to 627C and overlaps claimed aging range of 500 to 600C). Moreover, Takada teaches using a steel alloy having constituents whose wt% ranges overlap those recited by the claims. Note that the overlap in alloy wt% range and temperature ranges establishes a prima facie case of obviousness because it would be obvious to one of ordinary skill in the art to select the claimed ranges from the broader disclosure from the prior art since the prior art teaches similar high strength properties and same utility (components used under high stress).

6. Even though aging time is not disclosed by prior art, such would not be a patentable differences since it would be a matter of choice well within the skill of the artisan depending on desired strength and hardness desired, which is productive of no new and unexpected results. Moreover, prior art teaches air cooling similar to the present invention; and hence would be within the claimed range of less than or equal to 3C/sec.

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7. Even though prior art does not teach Cu or Ni alloying constituents, they would be expected to be present as inevitable impurities in trace amounts; and hence meet recited claims. Moreover, machining elements (Ca, Te, Se, Bi and Pb) are disclosed on lines 25 to 34 in column 5. In regard to 5 to 50ppm of B, it is commonly added to steel to further enhance hardenability ( as evident by Nakamura, lines 14-15 in column 5) and would be a matter of routine optimization to incorporate.

8. Prior art alloy discloses alloy wt% ranges that overlap those recited by dependent claims 5, 8 and 10.

9. Prior art teaches a steel part having a bainite microstructure and a tensile strength of at least 1000MPa; and hence meets claims 20 and 21. Even though yield strength is not disclosed, one would expect at least 900MPa since a high tensile strength is taught.

10. Claims 1,5,8 to 10 and 19 to 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent 2000-17374 alone or in view of Nakamura et al (US Patent 6,558,483).

11. JP'374 in paragraph 34 teaches producing a bainitic steel by hot forging at 1050 to 1200C (overlaps claimed range of 1100 to 1300C), air cooling at 72C/min (equivalent to 1.2C/sec and is within claimed range of not higher than 3C/sec) in the range of 800-500C (overlaps claimed range of 600-300C). Moreover, prior art claims 1 to 7 disclose a bainitic steel having constituents whose wt% ranges overlap those recited by the claims. Note that the overlap in alloy wt% range and temperature ranges establishes a prima facie case of obviousness because it would be obvious to one of ordinary skill in the art

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to select the claimed ranges from the broader disclosure from the prior art since the prior art teaches similar high strength properties and same utility (components used under high stress).

12. Even though prior art does not teach Cu or Ni alloying constituents, they would be expected to be present as inevitable impurities in trace amounts; and hence meet recited claims. In regard to 5 to 50ppm of B, it is commonly added to steel to further enhance hardenability ( as evident by Nakamura, lines 14-15 in column 5) and would be a matter of routine optimization to incorporate.

13. Prior art in Table 3 teaches a steel part having a bainite microstructure and a tensile strength of at least 1000MPa to 1300 MPA and a yield strength of at least 900MPa; and hence meet claims 20 and 21.

14. Claims 1,5, 8 – 11 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hill et al (Re.28,523).

15. Hill in claim 5 of column 27 discloses a bainitic steel alloy having a composition with composition with constituents whose wt% ranges overlap those recited by the claims. Moreover, Hill on lines 60 –69 in column 15 and lines 16 to 21 in column 16 discloses making bainitic steel in substantially the same manner as claimed by present invention comprising the steps of austenitizing (overlaps claimed range of 1100 to 1300C), hot deforming by forging, cooling to intermediate temperature productive of a bainitic structure on isothermal transformation and held at such temperature for a duration sufficient to transform the austenite to bainite (equivalent to cooling at less than

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3C/sec since lower limit is zero and within the bainitic temperature range of 600 to 300C) and on lines 51-55 of column 2 discloses aging at 400 to 1000F (equivalent to 204-538C for 1-2 hours and overlaps with claimed aging temperature ranges) .

16. Note that the overlap in temperature and alloying ranges establishes a prima facie case of obviousness because it would be obvious to one of ordinary skill in the art to select the claimed ranges from the broader disclosure from the prior art since the prior art teaches similar utility and high strength properties. The prior art alloy can be used for high stress applications, and exhibits a yield strength of at least 150 KSI (equivalent 1034 MPA and within the claimed range of at least 900 MPA) and a tensile strength of at least 175 KSI (equivalent to 1206.6 MPA and is within the claimed range of 1000 to 1300 MPA).

17. Claims 1,5,8 to 11, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al (US Patent 6,558,483) for the reasons set forth in the previous office action dated 6-30-05 and 12-07-05.

18. Claims 1, 5, 8 to 11 and 19 to 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent 2001-152246 for the reasons set forth in the previous office action dated 6-30-05 and 12-07-05.

***Response to Arguments***

19. Applicant's arguments filed 6-07-06 have been fully considered but they are not persuasive. In regard to the 103 rejection over Nakamura, it was argued that prior art teaches hot rolling whereas the present invention is directed to hot forging. It is the examiner's position that hot forging and hot rolling are well known techniques in the metallurgical art for hot working steel, and thus can be used interchangeably depending on the desired steel shape sought. This is evident by applicant's specification on lines 20 –21 on page 3 and lines 10-11 on page 5 which teaches present invention process can be performed by hot rolling or hot forging or a combination thereof, and there is nothing to show (e.g. by comparative test data) that hot forging is somehow critical or productive of new and unexpected results. Hence claims would not patentably distinguish over prior art.

20. It was argued that Nakamura steel Pcm value is not more than 0.28 whereas present invention steel examples, when calculated, have Pcm values greater than 0.28. It is the examiner's position that although Pcm values differ, prior art steel having low Pcm value would still suggest present invention steel since applicant does not require a Pcm value limitation.

21. It was argued that Nakamura does not teach a bainite microstructure or a controlled cooling rate of less than or equal to 3C/sec in the range of 600 to 300C. It is the examiner's position that Nakamura on lines 39-67 in column 6 teaches a cooling rate of 1 to 50C/sec (overlaps claimed range of no more than 3C/sec) with a finishing



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temperature of not higher than 580C ( overlaps claimed range of 600 to 300C) to produce the formation of lower bainite. Since applicant has not demonstrated criticality of the more narrowly claimed cooling rate and temperature range (e.g. by comparative test data), then claims would not patentably distinguish over prior art. Moreover prior art lower bainite would be equivalent to applicant's claimed bainite microstructure since they are both bainite.

22. In regard to the 103 rejection of JP'246, it was submitted that prior art requires Ni, Cu and Al , and optional V whereas present invention requires Cu, or Ni and Al , where they can also be replaced by V. It is the examiner's position that prior art still meets present invention since applicant's claims can also require both Ni and Cu and Al with V as optional. Also even though specific prior art examples do not meet the claimed composition such would not be a patentable difference since rejection is base on obviousness and not anticipation.

23. Applicant submitted that JP'246 discloses cooling steel product after forging from 900C at more than 0.5C/sec and keeps the product during at least 1800s (1/2 hour) within the lower bainitic domain whereas present invention teaches hot deforming in the range 1100 to 1300C followed by control cooling performed at a rate less than or equal to 3C/s in the range of 600-300C. It is the examiner's position that since JP'246 process can start cooling at a forging finishing temperature of 900C, then one skilled in the art would expect the actual hot forging temperature to be higher than 900C because hot forging is obviously performed at a higher temperature than its finishing forging temperature by a few hundred degrees; and hence would suggest the claimed forging

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temperature range of 1100 to 1300C . Moreover, JP'246 teaches cooling at more than 0.5C/sec from 900C to lower bainitic range and overlaps claimed cooling rate of no more than 3C/s from forging finishing temperature to 600 - 300C. Moreover, JP'246 maintains steel for 1800s within the lower bainitic domain having a cooling rate of zero and would be within applicant's claimed cooling rate range of less than or equal to 3C/sec since present invention cooling rate also has a lower limit equal to zero.

24. Furthermore, present invention recites a bainite microstructure which would broadly include lower bainite taught by prior art.


25. Although tensile and yield strength values as recited by claim 20 are not disclosed by prior art, such properties would be expected since composition and process limitations are closely met, and in absence of proof to the contrary.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deborah Yee whose telephone number is 571-27211253. The examiner can normally be reached on monday-friday 6:00am-2:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Deborah Yee  
Primary Examiner  
Art Unit 1742

dy